

GEL'MAN, A.S., doktor tekhnicheskikh nauk, professor; POPOV, V.S., kandidat tekhnicheskikh nauk.

Effect of the initial structure of 12Kh2MFB steel on its fusion welding.
Stal' 16 no.3:241-243 Mr '56. (MIRA 9:7)

1. Tsentral'nyy nauchno-issledovatel'skiy institut mashinostroyeniya i metallorabotki.
(Steel--Metallography) (Pipes, Steel--Welding)

GEL'MAN, A.S., doktor tekhnicheskikh nauk, professor; KABANOV, N.S.;
SLAPAK, E.S.; LEBEDEV, V.K., kandidat tekhnicheskikh nauk, retsenzent;
MEZHOVA, V.A., nauchnyy redaktor; TIKHANOV, A.Ya., tekhnicheskiy
redaktor

[Contact butt-welding of pipes] Kontaktnaya stykovaya svarka trub.
Pod red. A.S.Gel'mana. Moskva, Gos.nauchno-tekhn.isd-vo mashino-
stroit. lit-ry, 1957. 231 p. (MLRA 10:8)
(Electric welding) (Pipe, Steel)

FLUMAN, A. S.

BALKOVETS, Dmitriy Stepanovich; ORLOV, Boris Dmitriyevich; CHULOSHNIKOV, Pavel Leonidovich; GEL'MAN, A.S., doktor tekhnicheskikh nauk, professor, retsenzent; POZDNYAKOV, M.V., kandidat tekhnicheskikh nauk, retsenzent; VIKS, A.L., kandidat tekhnicheskikh nauk, redaktor; BOGOMOLOVA, M.F., izdatel'skiy redaktor; ROZHIN, V.P., tekhnicheskii redaktor

[Spot and roll welding of special steels and alloys] Tochechnaia i rolikovaiia svarka spetsial'nykh stalei i splavov. Moskva, Gos.izd-vo obor.promyshl., 1957. 429 p. (MLRA 10:9)
(Welding)

SOV/137-58-11-22872

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 149 (USSR)

AUTHOR: Gel'man, A. S.

TITLE: How to Apply Welding More Effectively (Povysheniye effektivnosti ispol'zovaniya svarki)

PERIODICAL: V sb.: Vopr. povysheniya proizvoditel'nosti truda v mashinostr. Moscow, Mashgiz, 1957, pp 303-320

ABSTRACT: The author examines the basic trends in machine-building industry toward a more efficient utilization of welding (W) procedures. An analysis of a number of welding operations and conditions of their employment indicates that considerable margins are available for the improvement of production figures of welding operations employed in machine building. In order to realize these margins, the following measures must be carried out: a) The fields of employment of the various types of welded structures should be expanded; b) only the most profitable techniques should be employed. This includes replacement of submerged-arc multipass W of steel 40-50 mm thick by electrical slag W; substitution of manual arc W by W in an atmosphere of CO₂; substitution of arc and torch W of thin steel by spot

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SOV/137-58-11-22872

How to Apply Welding More Effectively

welding and roller-type seam W; c) the efficiency of W processes should be increased through the employment of large-diameter electrodes in manual arc W, introduction of multi-spot W machines in resistance W in conjunction with mechanization of the associated auxiliary operations; plans for the future should include employment of integral mechanization and automation of assembling and welding operations together with the introduction of multi-operational machines and automated and continuous-production lines.

B. V.

Card 2/2

GEL'MAN, A-S.

135-2-1/12

SUBJECT: USSR/Welding

AUTHOR: Gel'man, A.S., Professor, Doctor of Technical Sciences.

TITLE: Fusion welding of aluminum alloy AK-6. (Svarka oplavleniyen aluminoyevogo splava AK-6).

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, #2, pp 1-5 (USSR).

ABSTRACT: The article deals with experimental investigation of weldability of the aluminum alloy AK-6, in order to determine the commercial advisability of welding on circular sections and flanges instead of casting complete parts.

Alloy AK-6 contains: 1.8 - 2.6 % Cu; 0.4 - 0.8 % Mg; 0.4 - 0.8 % Mn; 0.7 - 1.2 % Si. It represents a dispersion-hardening alloy which becomes after quenching (from 505-515°C) a hard aluminum solution. After aging (150 - 160° during 12-15 hours) the strengthening phases CuAl_2 , Mg_2Si , and $\text{Al}_{10}\text{Cu}_5\text{Mg}_6$ precipitate from the hard solution.

The welding experiments were performed on welding machine UK 5 MN-12 of 200 kva, equipped with a pneumo-hydraulic drive with

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TITLE: Fusion welding of aluminum alloy AK-6. (Svarka oplavleniya
aluminiumovogo splava AK-6). 135-2-1/12

maximum pressure of 12 tons and maximum setting speed of 100 mm/sec. It was concluded that good joints are obtained by welding 7 to 15 mm/sec, duration of process 1.2 - 1.5 sec, and setting speed not below 100 mm/sec. Welding with simultaneous cutting off the fins (2) was found practical. The experiments were performed by the instructor and Chief of the Laboratory of Contact Welding of TsNIITMASH, A. S. OVCHINIKOV.

The article contains 5 tables, 7 diagrams, 6 micro-photographs, and 4 references (3 of which are Russian).

INSTITUTION: LKHWTMAW (TsNIITMASH)

PRESENTED BY:

SUBMITTED:

AVAILABLE: At the Library of Congress

Card 2/2

GEL'MAN, A.S.

135-6-11/13

SUBJECT: USSR/Welding

AUTHOR: Professor Gel'man A.S., Doctor of Technical Sciences.

TITLE: The "MCT-200" Machine for Butt Welding of Pipes up to 76 mm Diameter. (Mashina MCT-200 dlya stykevoy svarki trub diametrom do 76 mm).

PERIODICAL: "Svarechnoye Proizvodstvo", 1957, # 6, p 26 (USSR)

ABSTRACT: The article contains description, technical characteristics and drawings of the welding machine "MCT-200" developed by the plant "Elektrik" according to plans made by the Central Research Institute for Heavy Machinebuilding "TsNIITMASH".

The machine is designed for automatic butt welding of boiler tubes of austenitic and perlitic steels, with continuous fusion, or with fusion and preheating. It is provided with a hydro-pneumatic drive, with double pneumatic clamps (the current conducting clamps with a maximum power of 16 tons, and additional clamps with clamping power of 24 tons) and a set of change clamps of lighter type for welding coiled tube elements.

The automatic control is designed by "TsNIITMASH" (see "Avtoгенное Дело" No. 1, 1952). It comprises the additional winding

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135-6-11/13

TITLE:

The "MCT-200" Machine for Butt Welding of Pipes up to 76 mm Diameter. (Mashina 'MCT-200' dlya stykovoy svarki trub diametrom do 76 mm).

of the welding transformer, which feeds the voltage relay. When the secondary voltage drops below the fixed range as a result of voltage drop in the line, the automatic blocking prevents the start of welding.

The article contains 3 drawings.

ASSOCIATION: Not stated.

PRESENTED BY:

SUBMITTED:

AVAILABLE: At the Library of Congress.

Card 2/2

GEL'MAN, A.S.

GEL'MAN, A.S., doktor tekhn.nauk

State of and margin for future development of resistance welding.
Svar.proizv.no.11:31-34 N '57. (MIRA 10:12)
(Electric welding)

Gel'man, A.S.

129-3-4/14

AUTHORS: Gel'man, A.S., Griboyedova, T.S., Ye.A. Davidovskaya, Lazarev, B.I., Lyubavskiy, K.V., Slepak, E.S., Trunin, I.I. and Fedortsov-Lutikov, G.P.

TITLE: Investigation of the Steel 1X18H12T as Tube Material for Power-generation Equipment (Issledovaniye stali 1Kh18N12T v kachestve trubnogo materiala dlya energoustanovok)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.3, pp. 16 - 24 (USSR).

ABSTRACT: For producing tubes operating at super-critical steam parameters, it is necessary to have available a cheap, strong and ductile material which has a stable structure and stable properties at 550 to 650 °C, is not inclined to develop inter-crystallite corrosion and possesses good technological properties. The work carried out in 1952 and 1953 by TsNIITMASH jointly with the imeni Ordzhonikidze Works (Ref.1) proved that it was possible to utilise cheap steel of the type 1X18H9T for operation at high temperatures. Later, complex investigations were carried out with this steel as a material for tubes of super-critical parameter power-generation equipment. The steel 1X18H9T may contain large quantities of ferrite and, after long-duration annealing at 600 to 700 °C, it embrittles due to the formation of a σ -phase. Increase in the nickel content

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Investigation of the Steel 1X18H12T as Tube Material for Power-generation Equipment

to 11-13% brought about an appreciable increase in the stability of the austenite without affecting the high strength. This steel, designated as 1X18H12T steel, does not show any α - or σ -phase separation during ageing at 700 °C for 10 000 hours and at 750 °C for 3 000 hours; only slight quantities of carbides were found to separate out. ²Thereby, the impact strength is maintained at 22-24 kg/cm² for this steel, whilst in the case of the steel 1X18H9T, it drops to 9-18 kg/cm². The investigations described in this paper were carried out on commercial tubes, rods and also on laboratory produced steels with compositions as given in Table 1, p.16. The results are entered in tables and plotted in graphs. It is concluded that the steel 1X18H12T, containing 0.08-0.12% C, max. 75% Si, 1-2% Mn, 17-18.5% Cr, 11-13% Ni, max. 0.20% S and max. 0.035% P, is suitable for operation at high temperatures; the Ti content of the steel is thereby determined by means of the formula 5(C-0.02). The best combination of mechanical properties was obtained after annealing at 1 050 to 1 100 °C for 30 min. and cooling in air, and this regime is recommended for tubes as well as for bends. Weld joints should be annealed at 1 000 to 1 050 °C for 1 hour

Card2/4 and then cooled in air. The mechanical properties of steels

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Investigation of the Steel 1X18H12T as Tube Material for Power-generation Equipment

heat-treated in accordance with these recommendations are entered in Table 6, p.24, for test temperatures of 20, 600, 650 and 700 °C. Practically no embrittlement takes place for this steel after ageing at 600 and 750 °C for durations of 3 000 to 10 000 hours; no σ -phase formation could be detected after such ageing for steel containing 12% Ni, whilst under similar conditions, σ -phase formation can occur in steel containing 10 % Ni. Preliminary, non-uniform work-hardening influences the ultimate strength of the steel, but does not influence appreciably the ductility in the case of long-duration loading. In the case of contact-welding of tubes of superheaters, the strength of non-heat-treated weld joints is not lower than that of the base metal. Steam at 600 °C and long-duration tests for up to 3 000 hours do not affect appreciably the long-duration strength of the steel and of welded joints. The steels 1X18H12T and 1X18H9T are less inclined to develop thermal fatigue than the steel 1X14H14B2M, and the authors recommend using the steel 1X18H12T for tubes of power-generating equipment, operating with steam of super-critical parameters. There are 5 figures, 6 tables and 8 references,

Card3/4 5 of which are Russian, and 3 English.

Investigation of the Steel 1X18H12T as Tube Material for Power-generation Equipment

ASSOCIATION: TsNIITMASH

AVAILABLE: Library of Congress

Card3/4 APPROVED FOR RELEASE: 08/31/2001

CIA-RDP86-00513R000514710003-0

135-58-7-5/20

AUTHOR: Gel'man, A.S., Doctor of Technical Sciences, and Kitayev, A.M.,
Candidate of Technical Sciences

TITLE: Roller Butt Welding with Straps (Rolikovaya svarka vstyk s
nakladkami)

PERIODICAL: Svarochnoye proizvodstvo, 1958, Nr 7, pp 17-19 (USSR)

ABSTRACT: The article presents results of experiments on roller butt
welding of sheet steel with the use of straps. The materials
used in experiments were low-carbon steel, "Kh17N2" chrome-
steel, "1Kh8N9T" stainless steel, and "VT-1D" commercial ti-
tanium; the straps in all experiments were made of "1Kh18N9T"
steel of 0.3 mm thickness and 4 mm width. This material was
chosen because of its high electrical resistance and low heat
conductivity. After tests, the following conclusions were
made: 1) blanks welded with straps can be subjected to stamping
with deep drawing, bending and other shape-changing operations;
2) the described welding method can be used for sheets of over
3 mm thickness, unlike the overlap welding method; 3) the
strength of welds under static and alternate loads does not
differ from the strength of overlap joints produced by roller

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Roller Butt Welding with Straps

135-58-7-5/20

welding.

There are 4 tables, 2 graphs, 2 diagrams and 4 photographs.

1. Spot welding--Test results 2. Steel--Spot welding

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GEL'MAN, A. S. (TsNIITMASH)

"The Needs of the Heavy Machine Building Industry for Welding Equipment,"

All-Union Conference on Prospects and Trends of the Development of Electric
Welding Equipment in the USSR fro 1959-1965

Svarochnoye Proizvodstvo, 1958, Nr 6, pp 13-17

AUTHOR: Professor Gel'man, A.S.

SOV/110-58-8-23/26

TITLE: On the Rigidity of Spot-welding Machines (O zhestkosti kontaktnykh svarochnykh mashin)

PERIODICAL: Vestnik Elektromyashlennosti, 1958, Nr 8, p 76 (USSR)

ABSTRACT: This is a brief discussion of an article by Candidate of Technical Science Shrayev, A.B., published in Vestnik Elektromyashlennosti Nr 9, 1957. The article considered a case of distortion in a welding machine with vertical travel of the upper electrode. The author's conclusion was that the absolute rigidity of the machine did not influence the welding conditions. However, this conclusion is not valid for machines with radial electrode traverse, which are coming into more general use. In these,

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SOV/110-58-3-23/26

On the Rigidity of Spot-welding Machines

distortion of the machine affects the welding conditions,
so that the clauses concerning rigidity remain an
essential part of the standard specification.

There is 1 figure; no literature references

1. Spot welding--Equipment
2. Machines--Stability

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SOV-135-58-9-9/20

AUTHORS: Gel'man, A.S., Doctor of Technical Sciences, Professor, Mel'-bard, S.N., Engineer, Sinadskiy, S.Ye., Candidate of Technical Sciences, and Cheshev, P.I., Engineer

TITLE: Electric Slag Welding of Hydro-Turbine Shafts (Elektroshlakovaya svarka vala gidroturbiny so svarnoy obechaykoy)

PERIODICAL: Svarochnoye proizvodstvo, 1958, Nr 9, pp 26-32 (USSR)

ABSTRACT: Information is presented on experimental work conducted by I.R. Kryamin, at the TsNIITMASH, together with LMZ, NKMZ, KhTGZ, NKMZ and the Izhorskiy Plant on the development of materials and technology for the production of welded shafts of powerful hydro-turbines with the use of the electric-slag welding process. In this connection, weldability of "20GSL" and "20GS" steel was investigated, welding technology was developed, and tests were carried out on turbine shafts for the Stalingrad GES. The following personalities participated in the work: Candidate of Technical Sciences I.I. Brinberg, and Engineers A.I. Rymkevich, A.D. Kuznetsova-Sadovnikova, N.I. Malyavkina. From LMZ: Engineers V.I. Faust, V.D. Averin, Z.M. Gamze, G.A. Branovskiy, G.I. Mart'yanov, R.K. Fasulati and the welding operators V.A. Petrov, M.I.

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, Electric Slag Welding of Hydro-Turbine Shafts

SOV-135-58-9-9/20

Gorbachev, M.A. Grinovskiy. Technical economical analyses were carried out by Engineer S.P. Golosovskiy (TsNIITMASH). It was proved that "20GSL" and forged "20GS" steel can be successfully welded by the electric-slag method if the steel had been properly cast. Information includes detailed recommendations including technology and materials. There are 7 tables, 4 graphs, 3 diagrams, 4 photos and 5 Soviet references.

ASSOCIATION: TsNIITMASH

1. Turbines 2. Shafts--Welding 3. Arc welding--Applications

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25 (0)

SOV/135-59-4-17/18

AUTHOR: Gel'man, A. S., Doctor of Technical Sciences

TITLE: A Review of the Book "Electric Contact Welding" by N. P. Sergeyev and M. S. Feygenson, Second Edition, Revised and Supplemented. Mashgiz 1958 (Retsenziya na knigu N. P. Sergeyeva i M. S. Feygenson "Elektricheskaya kontaktnaya svarka". Izdaniye vtoroye, pererabotannoye i dopolnennoye Mashgiz 1958)

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 4, pp 45 - 46 (USSR)

ABSTRACT: The subject book is a manual of 282 pages, written for foremen and team-leaders of assembly shops of machine building plants, suitable also for welders and mechanics. The author considers the book on the whole useful and plainly written but points out the following shortcomings: 1) it includes detailed descriptions of equipment that never was actually in use; 2) omits some processes and some equipment units that are now in use; 3) contains erroneous statements (a long series of such statements are cited) 4) contradictory or unclear recommendations. He says that the authors must

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SOV/135-59-4-17/18
A Review of the Book "Electric Contact Welding" by N. P. Sergeyev and
M. S. Feygenson, Second Edition, Revised and Supplemented. Mashgiz 1958

consider all the minor faults of the book if they are to
improve it, but that the second edition contains less
faults than the first.

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18(5), 25(1,5)

SOV/135-59-7-6/15

AUTHORS: Geliman, A.S. Doctor of Technical Sciences, Professor,
and Slepak, E.S., Candidate of Technical Sciences
(TsNITMASH), Iashchikov, S.V., Candidate of Technical
Sciences (NIITAVTOPROM), Kozlov, E.V., (Mytishchi
Machine Building Plant)

TITLE: Projection Spot Welding of Hot Rolled Steel

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 7, pp 19-22 (USSR)

ABSTRACT: The authors review the experience in projection spot-
welding of hot-rolled steel sheers at the Mytishchin-
skiy mashinostroitel'nyy zavod (Mytishchi Machine
Building Plant). This method was suggested by TsNIT-
MASH several years ago, then studied by NIITAVTOPROM
and finally it was introduced at the aforementioned
plant. There it is used for the manufacture of semi-
trailer parts with satisfactory results. The authors
present operational data in tables and graphs. There
are 3 photographs, 4 diagrams, 3 tables and 1 graph.

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707/175-52-7-6/15

Projection Spot Welding of Hot Rolled Steel

ASSOCIATION: TsNIITMASH; NIITAVTOPROM; Mytishchinskiy mashino-
stroitel'nyy zavod (Mytishchi Machine Building
Plant)

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18(5) 25(1,5)

SCV/135-59-7-10/15

AUTHORS:

Kogos, A.M., Ryss, R.A., Engineers,
Gelman, A.S., Doctor of Technical Sciences, Professor,
Kabanov, N.S., Candidate of Technical Sciences

TITLE: Resistance Welding in Steel Sheet Production

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 7, pp 34-39 (USSR)

ABSTRACT: The experience in introducing resistance butt welding at metallurgical plants showed that resistance welding may produce an essential engineering and economic effect, especially, when together with a well adjusted butt welding machine some other, higher requirements of the metal strip are met. The equipment developed and the technology of butt-welding of strips which was tested under difficult work conditions of metallurgical plants, is a means for increasing the productivity of machinery for cold-rolling of sheets. This process must find wide-spread application in new rolling-mill shops which are to be constructed in accordance with the Seven-Year-Plan. In table 1 the authors present basic data of TsNITMASH butt welding

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SOV/135-50-7-10/15

Resistance Welding in Steel Sheet Production

machines. Such equipment was developed by TsNIITMASH during the past years and was installed at the plants "Elektrostal'", "Zaporozhstal'", "Magnitogorskiy metallurgicheskiy kombinat (Magnitogorsk Metallurgical Combine). Fig. 2 shows a welding machine 1700 built by EZTM, used for welding steel strips in a rolling mill, whereby such processes as pickling, tinning, etc. may be performed continuously. In table 2 the authors present data for welding low carbon steel strips at welding machines 1600 and 1700. There are 2 photographs, 9 diagrams, 2 tables and 1 graph.

ASSOCIATION: TsNIITMASH

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SOV/135-59-10-8/23

18(5)

AUTHORS: Gel'man, A.S., Doctor of Technical Sciences, Professor, and Sander, M.P., Engineer

TITLE: Power Demand and Heating During Friction Welding of Steel Pipes With Thick Walls

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 10, pp 18-20 (USSR)

ABSTRACT: Experiments were carried out in TsNIITMASH to investigate the emission and distribution of heat during friction welding of pipe elements up to 160 mm in diameter and, concurrently, the optimum parameter was determined. It was found that the variation of the power demand is a function of the frictional coefficient which, in turn, is dependent on the specific pressure, the angular velocity, and the temperature. These parameters of the frictional coefficient were studied during friction welding of pipe elements. To determine the frictional coefficient required for a certain power and vice versa, different calculation methods are briefly elaborated, which were also verified by experiments, during which the power and frictional coefficient were varied alternately. It

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Power Demand and Heating During Friction Welding of Steel Pipes With Thick Walls

was found that the slow increase of the power demand at the beginning of the process (Fig.1) is not solely influenced by the frictional coefficient as the temperature increases, but is also a function of the gradually increasing pressure between the contacting surfaces. It is emphasized that the heat distribution during the initial state shows a random characteristic and is only dependent on the actual arrangement of the contacting points. The authors provide the summary of the experiments stating that with the increasing temperature, the frictional coefficient increases initially and then decreases as the process continues. In the examined range the increase of the linear velocity and the pressure result in a diminishing frictional coefficient. The characteristics of the power demand are analogous. For the better utilization of welding equipment it is recommended that the process be initiated at relatively low pressure and as the desired temperature is attained, the pressure be increased gradually. In the described manner the heat distribution is acceptable both radially as well as in the perimeter of the welding seam. Taking into

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Power Demand and Heating During Friction Welding of Steel Pipes With Thick Walls

account the fast heat distribution at the ends, the calculation of the power demand has to be based on the assumption of wear of the ends by rotation. There are 2 photographs, 1 diagram, 4 graphs and 3 references, 2 of which are Soviet and 1 Czech.

ASSOCIATION: TaNIITMASH

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S/135/60/000/010/002/015

A006/A001

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AUTHORS: Gel'man, A. S., Professor, Doctor of Technical Sciences, Mel'bard,
S. N., Bogdanov, V. N., De-Millo, P. G., Grum-Grzhimaylo, I. A.,
Engineers

TITLE: Pipe Welding by Radio-Frequency Current

PERIODICAL: Svarochnoye proizvodstvo, 1960, No. 10, pp. 4-7

TEXT: The welding of up to 6 mm thick pipes by radio-frequency current was first investigated in 1958 at TsNIITMASH. Further studies were performed together with NIITVCh. The following personalities participated in the work: from TsNIITMASH: I. L. Brinberg, Candidate of Technical Sciences; from VNIIMETMASH: V. V. Nosal, Doctor of Technical Sciences, Anisiforov, Candidate of Technical Sciences, N. A. Sarychev, and V. S. Antsiferov, engineers; from NIITVCh: N. P. Glukhanov, Candidate of Technical Sciences. On a laboratory installation (Fig. 2) strips with chamfered edges were drawn by clamping rollers at a required opening angle between the edges to be welded (α). The overlap of the strips was fixed by supporting rollers. Radio frequency current was fed to the edges through sliding contacts. The current was concentrated on the edge

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A006/A001

Pipe Welding by Radio-Frequency Current

surface and penetrated to a depth of 0.04 - 0.12 mm. The molten metal was pressed by the rollers thus forming the welded joint. The welding speed was 3.5 - 20 m/min. The magnitude of compression ranged from 0 to 4,000 kg. Experimental welds were made on 3 - 6 mm thick carbon steel strips with chamfered edges. Specimens of the welds were subjected to static tests and showed a strength equalling that of the base metal. The quality of the joint is determined by the uniform heating of the edges. Stable heating conditions are obtained at an opening angle of the edges not below 4° . The uniformity of heating is enhanced by a greater slope of the chamfer (β). Best results were obtained at $\beta = 42^\circ$. The quality of the welds depends moreover to a high degree on the dimension of the overlap which must be maintained with great accuracy. Satisfactory results when welding 3 mm thick strips were obtained under the following conditions: electric generator of 9 kw voltage and 9 amp current intensity; 6 m/min welding speed; 4,000 kg compressive force. It was established that the quality of joints when welding 3 - 6 mm thick strips was improved by increasing the compression of the edges in the welding area. Welding conditions for chamfered strips are given in Table 1 and mechanical properties of joints are represented in Table 2 and 3. Overlap welding of chamfered edges with radio frequency current may be used for the production of pipes with helical seams and for

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Pipe Welding by Radio-Frequency Current

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A006/A001

large-diameter pipes with straight seams. Welding without chamfering is simpler and may be used when the structures to be welded permit such type of joint. There are 7 figures and 3 tables.

ASSOCIATION: TsNIITMASH (Gel'man, Mel'bard); NIITVCh (Bogdanov, De-Millo);
VNIIMETMASH (Grum-Grzhimaylo)

X

Card 3/3

GEL'MAN, Aleksandr Samuilovich, doktor tekhn. nauk, prof.; BALKOVETS, D.S., doktor tekhn. nauk, red.; ALOV, A.A., doktor tekhn. nauk, prof., retsenzent; SOBOLEVA, G.N., red. izd-va; CHERNOVA, Z.I., tekhn. red.

[Technology and equipment for resistance welding] Tekhnologiya i oborudovanie kontaktnei elektrosvarki. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1960. 367 p. (MIRA 14:7)
(Electric welding—Equipment and supplies)

20225

S/135/61/000/004/001/012
A006/A101

1.230

AUTHORS: Gel'man, A. S., Professor, Doctor of Technical Sciences, Pavlich-
enko, V. S., Engineer

TITLE: The Effect of Real and Inductive Resistance of a Butt-Welding Ma-
chine on the Flash-Welding Process

PERIODICAL: Svarochnoye proizvodstvo, 1961. No. 4, pp. 1 - 6

TEXT: Investigations made by TsNIITMASH and the Institute of Electric
Welding imeni Ye.O. Paton, have shown that the electrical parameters of a butt-
welding machine, strongly affect the flash welding process. The authors studied
separately the effects of real and inductive resistance of the welding machine on
the magnitude of minimum voltage (U_{20min}), necessary for the excitation and main-
tenance of continuous flashing; the nature of the flashing process; the shape
of flashed butts, the effective thermal efficiency of the process; the quality
of weld joints; the heating of the parts to be flash-welded; the power consumed,
the effective current and the effective resistance of the welding zone. All the
experiments were carried out on a 150 kvamp machine. Changes in the real resist-
ance of the primary circuit were produced by a ballast rheostat RB - 300 ($R_1 \leq$

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Central Soc Sci Res Inst Technology & Machine Bldg

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S/135/61/COO/004/001/012
A006/A101

The Effect of Real and Inductive Resistance of a Butt-Welding Machine on the Flash-Welding Process

0.34 ohm) and in the induction resistance by two welding chokes connected in series ($X_1 \leq 1.2$ ohm at 100 amp current in the primary circuit). The experiments were made with 32 x 3.5 mm "20" grade steel pipes. The following flash welding conditions were employed, assuring satisfactory weld joints without additional resistance: adjusted length -40 + 40 mm; duration of cycle -12 sec; flashing distance -11 mm; mean flashing speed 0.92 mm/sec; maximum flashing speed prior to upsetting 1.7 mm/sec; upset distance 4.5 mm; upset speed 50 mm/sec. The effect of the machine resistance was evaluated by current and voltage scillograms, recorded on the MNO -2 (MPO-2) oscillograph. Due to the similarity of both the primary and secondary current curves, already previously observed by V. Ya. Khazov (Ref. 6), only the primary current was oscillographed. In studying the effect of the machine resistance on the minimum idle run voltage and the nature of the flashing process it was found that at constant parameters, the increase of real resistance (Figure 2) affected the value U_{20min} much more than the corresponding increase of inductive resistance. This confirms the dependence previously established by V. K. Lebedev and G. V. Barburon (Ref. 4). The oscillograms obtained show that the current never changes its sign within one half-period which confirms V. Ya. Khazov's conclusion (Ref. 7) on the absence of a cross piece of a

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dynamic capacitor during the break, as was previously assumed (Ref. 1). The effect of the resistance on the depth of craters in the pipe is shown in figure 4. The effect of the machine resistance on the heating of pipes was studied by measuring the temperature with chromel-alumel thermocouples (Fig. 5a) and by recording calorimetrically the heat content of the flashed pipe at the end of the process and during intermediate periods. Temperature distribution curves are given in Fig. 5. It was found that an increase in the real resistance in both the primary and secondary circuits impaired the heating conditions (drop of temperature) which is probably due to the reduced existence and the size of fused metal cross pieces between the butts. The effect of the resistance on the active power consumed during flashing was determined from oscillographic recordings and calculations on the basis of indices from a single-phase electric power meter. The effective thermal efficiency of the flashing process η_{fl} , was determined by formula (1) $\eta_{fl} = \frac{Q_d}{Q_d + Q_{br}}$ (where Q_d is the heat contained in the flashed parts,

Q_{br} is the heat emanated during the flashing process with the metal splashings),

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The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

and the equation of heat balance (2) $Q_{tot} = Q_1 + Q_2 + Q_d + Q_{br} + Q_n$, where Q_{tot} is the total amount of heat in cal liberated during flashing process; Q_1 and Q_2 are the heats emanated in the primary and secondary circuits of the machine and Q_n is the heat loss. Formulae are also given for determining the effective current during flashing; the effective welding current, the effective resistance of the welding zone and the effective resistance of the welding circuit. Results are given in Figure 7. It was established that the resistance of the machine did practically not affect the number of pulses but affected strongly the effective flashing resistance. This is in a certain disagreement with V. Ya. Khazov's conclusions that the flashing resistance is directly affected only by the inductivity of the welding circuit and the duration of closing and breaking of the welding circuit. As a result of the investigation performed the authors draw the following conclusions: An increased resistance of the machine causes a considerable increase of the minimum idle-run voltage, necessary to maintain the flashing process. The strong effect of the real resistance is confirmed (due to high $\cos \varphi$ during the flashing). Increased resistance of the machine reduces the stability of flashing (carried out at U_{20min}). However, at a raise of R the amount of current pulses

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during a half-period does not noticeably change, it decreases abruptly with increasing inductive resistance X . When the real resistance is prevalent, the current often does not reach zero during the failure of the cross piece. This indicates the possibility of several cross pieces existing under the described conditions, which are not simultaneously disrupted. An increase of the machine resistance decreases noticeably the degree of heating the parts, flashed at $U_{20 \text{ min}}$; whereby higher R has a greater effect than increasing X . The increasing resistance reduces the effective thermal efficiency of flashing. The increase of the machine resistance, in particular of the real resistance, causes the increase of the mean effective resistance and a reduction of the mean effective current. An increase in the machine resistance (during welding at $U_{20 \text{ min}}$) degrades the quality of the weld joints, in particular when the real resistance increases. This indicates the possibility of defects due to the higher resistance of the welding circuit of the machine resulting from the impaired state of the transition contacts. There are 2 tables, 7 figures and 7 Soviet references.

ASSOCIATION: TsNIITMASH
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S/135/61/000/004/001/012
A006/A101

The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

Figure 2:

Dependence of the minimum idle-run voltage on the resistance of the weld

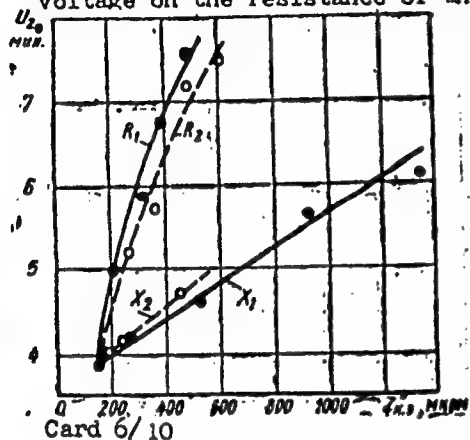
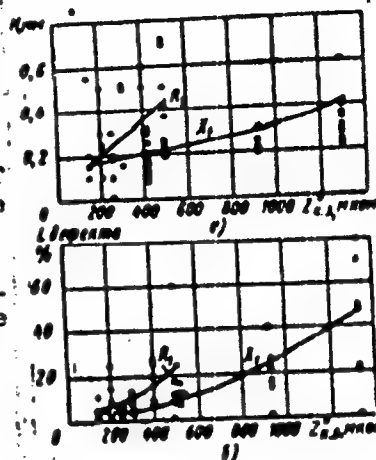


Figure 4:

Dependence of the depth of craters machine (a) and the total extent of defective areas of pipe butts (b) on the resistance of the machine (Zk. 3) when introducing additional real and inductive resistances (R_1 and X_1).

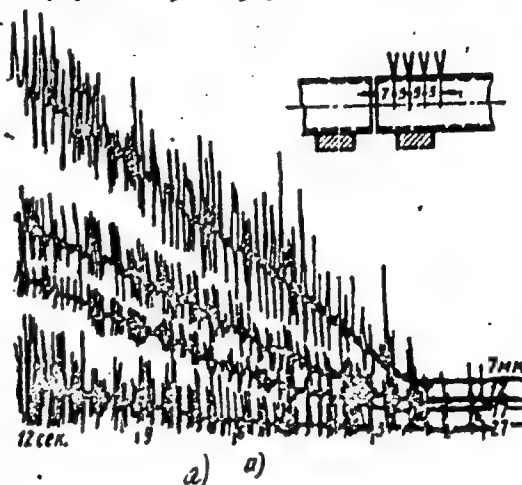


S/135/61/000/004/001/02
A006/A101

The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

Figure 5: Changes in temperature of flashed pipes of 32 x 3.5 mm dimensions:

a) - standard oscillogram of temperature changes during flashing process;



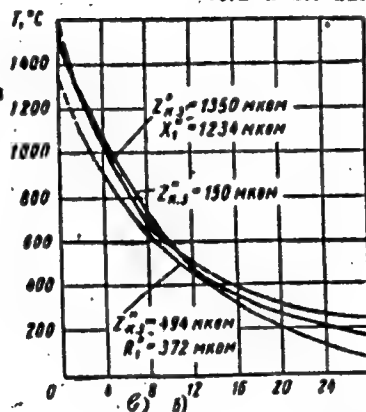
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S/135/61/000/004/001/012
A006/A101

The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

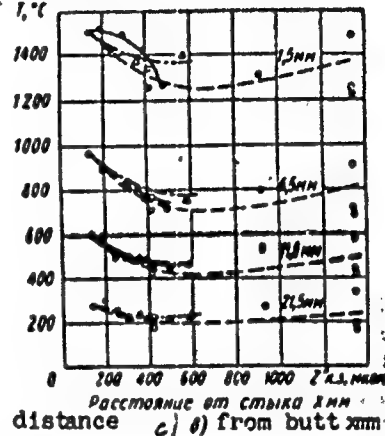
Figure 5 continued;

b) - temperature distribution along the generatrix of the pipe at the end of setting at various resistances of the machine;



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c) - temperature of heating the pipe at the end of flashing in spots at distances of 1.5; 5.5; 11.5 and 21.5 mm from the butt at changing R_1 (continuous line) X_L (dotted line) and R_2 (dot-and-dash line).



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A006/A101

The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

Figure 6:

Dependence of heat content of pipes flashed at $U_{20\min}$ (a), of mean active power b) and mean effective thermal efficiency of the flashing process (c) on the resistance of the machine at varying its real and inductive components.

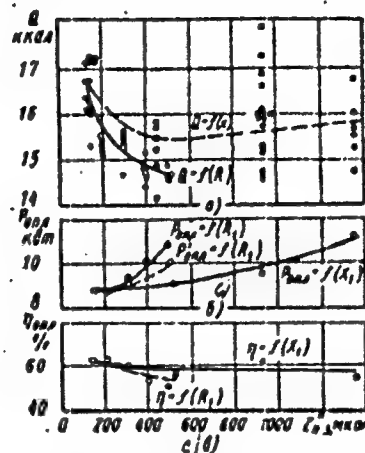


Рис. 6. Зависимости теплоемкости труб, оплавленных при $U_{20\min}$ (а), среднего значения активной мощности (б) и среднего эффективного термического к.п.д. процесса оплавления (в) от сопротивления машины при изменении его активной и индуктивной составляющих.

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The Effect of Real and Inductive Resistance of a Butt-Welding Machine in the Flash-Welding Process

Figure 7:

Dependences of the mean effective current in the welding circuit when flashing 32 x 3.5 mm pipes (a) and of the mean effective resistance of flashed butts (b) on the resistance of the welding machine at varying its real and inductive components.

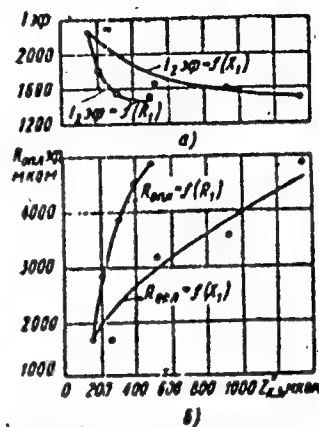


Рис. 7. (Зависимости среднего эффективного тока в сварочной цепи при оплавлении труб 32x3.5 мм (а) и среднего эффективного сопротивления оплавленных торцов (б) от сопротивления сварочной машины при изменении его активной и индуктивной составляющих.

Card 10/10

GEL'MAN, A.S.

Initial electric resistance in spot welding. Avtom.svar. 14
no.7:25-32 J1 '61. (MIRA 14:7)

1. TSentral'nyy nauchno-issledovatel'skiy institut tekhnologii i
mashinostroyeniya.

(Electric welding)

GEL'MAN, A.S.; GRINEVICH, G.F., prof.; GRINEVICH, G.G.; ZOTOV, V.P.;
KOMAROV, G.V.; PAVLOV, S.M.; FIRMON, A.V.; TRUBIN, V.A., glav.
red.; SOSHIN, A.V., zam. glav. red.; YEPIFANOV, S.P., red.;
ONUPRIYEV, I.A., red.; KHOKHLOV, B.A., red.; ZIMIN, P.A., red.;
KRONOSHECH, I.L., inzh., red.; NAUMOVA, G.D., tekhn. red.

[Handbook on loading, unloading, and conveying operations in
construction] Sptavochnik po pogruzochno-razgruzochnym i trans-
portnym rabotam na stroitel'stve. Pod red. G.P. Grinevicha.

Moskva, Gosstroizdat, 1962. 175 p.

(MIRA 15:9)

(Kazhdaye razdelenie) (Building materials)

S/590/62/104/000/001/006
1007/1207

AUTHOR: Gel'man, A. S. Doctor of technical Sciences, Professor

TITLE: Investigations on butt flash-welded perlite and semiperlitic steel tubing

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya [Trudy], v. 104. 1962, Voprosy svarki v energomashinostroyenii, 5-29

TEXT: Results are reported of investigations carried out at the TsNITMASH on various steel grades of the perlite and semiperlitic class in order to find optimum conditions for butt flash welding and inert-gas resistance-welding of the above steel grades. After detailed description of internal structure and chemical composition of the steel grades mentioned, the effect of the composition of steel on its behavior during flash-welding was studied. It was shown that an increase of the chromium content up to 12% does not markedly affect the behavior of steel during flash-welding. The influence of welding conditions on the quality of the resulting joint has been the object of another series of tests. The method for program controlling welding voltage advanced by the Institute elektrosvarski im. Paton (Institute for Electric Welding im. Paton) was found to markedly improve the conditions of continuous flash-welding and to widen the field of its application. Tests were carried out on resistance-welding in a gaseous atmosphere by burning special gas-evolving cylindrical briquettes inserted in the tubes to be welded. These tests once more confirmed the efficiency of gaseous atmosphere in resistance welding. The paper also reports on tests of metal-coated steel tubes; the data so far

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Investigations on built...

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1007/1207

obtained are more of informational character, and the dependence of metal-coated steel tubes on the internal structure should be the object of further studies. Particular attention has been paid to heat-treatment conditions after flash-welding. While for certain perlite steels heat-treatment after flash-welding is not mandatory other steel grades flash-welded but not heat treated were found to have insufficient plastic joints. The importance of improved heat-treatment technology for the obtaining of high-quality welded joints is stressed. There are 15 figures, 14 tables and 5 references. The single English reference reads: Young, I. F. and Briggs, A., The effects of phosphate coating on flash welding of steel tubing, Welding Journal, no. 9, 1956.

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya (Central Scientific Research Institute of Technology and Machine building)

Card 2/2

GUSAKOV, S.F., inzh., red.; GEL'MAN, A.S., inzh., red.; KLIMOVA,
G.D., red. izd-va; RODIONOVA, V.M., tekhn. red.

[Construction specifications and regulations] Stroitel'nye
normy i pravila. Moskva, Gosstroizdat. Pt.2. Sec.D.
ch.2.[Railroad gage of 1524 mm. for industrial enterprises;
design specifications] Zheleznye dorogi kolei 1524 mm pro-
myshlennykh predpriatii; normy proektirovaniia
(SNiP II-D.2-62). 1963. 42 p. (MIRA 17:1)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam
stroitel'stva. 2. Gosstroy SSSR (for Gusakov). 3. Gosudar-
stvennyy proyektnyy i nauchno-issledovatel'skiy institut
Promtransniiprojekt Gosstroya SSSR (for Gel'man).

45649

S/135/63/000/003/011
A006/A101

1.2300

AUTHORS: Gel'man, A. S., Professor, Doctor of Technical Sciences, Mel'bard,
S. N., Engineer

TITLE: The effect of current distribution over the section of flash-welded
joint properties

PERIODICAL: Svarochnoye proizvodstvo, no. 8, 1963, 8 - 12

TEXT: In the investigation particular stress was laid upon studying local
peculiarities of the flashing process during the stages preceding upsetting.
These processes were investigated on about 40 mm² sections of the flash-welded
butts. The data obtained from current oscillograms were compared with the pro-
perties of the weld joints. Welding experiments were performed on low-carbon
steel pipes, 32 mm in diameter and walls, 4.5 mm thick. A butt welding machine,
200 kvamp power, designed by TsNIITMASH was used. To study local flash proces-
ses, the current was oscillographed on separate sections of the flash welded
pipes using an eight-channel "N-102" oscillograph and standard vibrators. The
pipe ends were cut into 6 segments with 3 mm wide slots. A pipe section having

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The effect of current distribution over the...

8/135/63/000/003/011
A006/A101

copper conductors and another section with 10 mm long slots, but without conductors, were mounted on the machine and welded. The oscillograms show that this method reveals individual peculiarities in the current flow on separate sections. With the aid of this special method it was established that the heterogeneous properties over the section of flash-welded joints may be caused by the local non-stability of the flash process in the stage, preceding upsetting. Interruptions in the current flow immediately preceding upsetting on small sections of the flashed butts, during 0.02 sec and more, and flow of current with low pulse amplitudes on these sections during the same period of time, cause locally impaired quality of the joint. The stability of the flashing process in the stage, preceding upsetting is a most important condition for assuring the homogeneous quality of the joint. The stability of the process, evaluated from the summary current, is not a sufficient criterion for local flashing stability. Short jump-like increased flashing speed preceding upsetting, increases the local flashing ability and does not impair conditions of heating the parts to be welded. Heterogeneity of the weld joint properties is considerably reduced. In welding pipes 300 - 400 mm², flashing at increased speed should proceed within 0.15 - 0.2 sec. There are 2 tables and 7 figures.

ASSOCIATION: TsNIITMASH

Card 2/2

GEL'MAN, A.S.

Designing of industrial transportation. *Biul.stroi.tekh.* 27 no.5:
46-47 My '63. (MIRA 17:3)

1. Glavnyy inzh. Gosudarstvennogo proyektного instituta po izyskaniyu
i proyektirovaniyu sooruzheniy promyshlennosti transporta Gosstroya
SSSR.

GRINEVICH, Georgiy Petrovich; GRINEVICH, Georgiy Georgiyevich;
GEL'MAN, Aleksandr Samoylovich; KAZARINOV, V.M., kand.
tekhn. nauk, nauchn. red.; GORDEYEV, P.A., red.;
SHIROKOVA, G.M., red.

[Comprehensive mechanization of loading and unloading
work and transportation operations in construction] Kom-
pleksnaya mekhanizatsiya pogruzochno-razgruzochnykh ra-
bot i transportnykh operatsii v stroitel'stve. Moskva,
Stroizdat, 1964. 363 p. (MIRA 17:6)

I 16660-65 EWT(m)/EWP(w)/EWA(d)/RWP(v)/EWP(t)/EWP(k)/EWP(b) PF-4 AFWL/

AND(m)-3 MJW/JD/HM

ACCESSION NR: AP4042221

8/0135/64/000/007/0016/0019 B

AUTHOR: Ry'mkevich, A. I. (Engineer); Gel'man, A. S. (Doctor of technical sciences)

TITLE: Electroslag welding of high-alloy 10Kh18N30D2L and 0Kh12NDL steels with low-alloy steel 18 18 18 18

SOURCE: Svarchnoye proizvodstvo, no. 7, 1964, 16-19

TOPIC TAGS: electroslag welding, highalloy steel, lowalloy steel, C, Si, Mn, Cr, Al, Ni, Cu, strength, creep rate, impact toughness, elongation

ABSTRACT: The authors investigate three methods of welding heterogenous steels:

(1) by high-alloy rod producing an austenitic weld; (2) by low-carbon rod producing a ferritic-pearlitic weld; (3) by alloy rod introducing Armco-iron into the welding zone and producing welds with a pearlitic-carbide structure of sorbitic pearlite.

In electroslag welding of 10Kh18N30D2L steel (0.11 C, 0.52 Si, 2.78 Mn, 18.75 Cr, 3.30 Ni, 2.15% Cu) and 0Kh12NDL steel (0.07 C; 0.11 Si; 0.32 Mn; 12.1 Cr; 1.1 Ni and 1.1% Cu) with a low alloy steel such as 20GSL (0.15 C; 1.22 Si; 1.47 Mn) or 12G2V (0.20 C; 0.30 Si; 1.92 Mn; 0.08 V; 0.48 W) by means of a welding rod high in Cr and Ni, the weld metal possesses high plastic properties and impact toughness 18

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I. 16660-65

ACCESSION NR: AP4042221

but inadequate strength (22-24 kg/mm²). An attempt to reinforce the weld with up to 5% Cu, 2.5% Al and 4.3% Mo failed to produce satisfactory results. The best results in combining high-alloy and low-alloy steel were obtained in employing an Sv-04N3M rod (0.06 C; 0.13 Si; 0.45 Mn; 3.4 Ni; 0.73 Mo) and introducing Amco-iron into the weld (thickness 8 to 12 mm). Strength and plastic characteristics were then as follows: $\sigma_T \approx 30 \text{ kg/mm}^2$; $\sigma_B \approx 50 \text{ kg/mm}^2$; $\delta \approx 10\%$; $\alpha_k \approx 5 \text{ kg/cm}^2$. The depth of fusion of each of the edges being welded may vary from 5 to 15 mm. The same depth of fusion produced good results in welding OKh12NDI and 10Kh18N33D2I steels by electroslog method with 1502V steel. Orig. art. has: 8 figures and 3 tables.

ASSOCIATION: TANIITHASH

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF SOV: 005

OTHER: 001

Card 2/2

GEL'MAN, A.S., doktor tekhn. nauk

Ways of expanding resistance welding. Svar. proizv. no.8:1-3
Ag '64. (MIRA 17:9)

1. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i
mashinostroyeniya.

L 32255-65 EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b) NJW/JD/HM

ACCESSION NR: AP4049506 S/0135/64/000/011/0001/0004

AUTHORS: Kudryavtsev, F.I. (Engineer); Gel'man, A.S. (Doctor of technical sciences)

TITLE: The effect of mechanical inhomogeneity on the fatigue strength of weld joints

SOURCE: Svarochnoye proizvodstvo, no. 11, 1964, 1-4

TOPIC TAGS: weld joint, filler metal, parent metal, mechanical property, fatigue strength

ABSTRACT: The effect of variable stress on the strength of weld joints with appreciable inhomogeneity was investigated in 40Kh type steel serving as parent metal for welds with soft fillers and as a hard filler metal, and in St.3 type steel used as parent metal with hard fillers and as a soft filler metal. The fatigue strength of the two types of steel specimens was 35.5 kg/mm² and 19.5 kg/mm² respectively. All specimens were hardened and tempered at 840 C and 400 C. The conspicuous difference in the mechanical properties of a weld joint with a hard filler and soft parent metal did not affect the fatigue strength. In specimens

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L 32255-65

ACCESSION NR: AP4049506

with a soft layer, the strength of the filler metal was decisive whenever the thickness exceeded 0.75 of the 20 mm diameter of the specimens. A decrease in the relative filler thickness below a critical thickness enhanced the resistance to weld fatigue. Apparently, this effect resulted from the state of stress that expands throughout the filler metal. Surface machining had a beneficial effect on fatigue strength of specimens with a soft filler whatever its thickness. In specimens with a thin filler metal, the fatigue strength of the work-hardened filler approximated that of the parent metal. The findings of the authors hold for inhomogeneous weld joints without stress centers and it may be assumed that the presence of such centers would change the pattern of stress propagation. Orig. art. has: 8 figures and 1 table.

ASSOCIATION: TANITMASH

SUBMITTED: 00

DATE ACQ:

ENCL: 00

SUB CODE: 144

NR REF SOV: 006

OTHER: 000

Card 2/2

L 55950-65 EWA(a)-2/EWT(m)/EWP(w)/EWA(d)/EWP(v)/EWP(t)/T/EWP(b)/EWP(k)/EWP(r)/
EWA(c) Pf-L/Pad IJP(c) MJW/JD/HM/HW/JG

ACCESSION NR: AR5008969

S/0137/65/000/001/E024/E024

621,791.765

SOURCE: Ref. zh. Metallurgiya, Abs. 1E135

AUTHOR: Rymkevich, A. I.; Gel'man, A. S.

TITLE: Joining dissimilar steels by electroslag welding

CITED SOURCE: Tr. Leningr. metal. z-da, v. 11, 1964, 152-166

TOPIC TAGS: metallurgy, ferrous metal, welding

TRANSLATION: Electroslag welding of dissimilar steels was studied. It was found that electroslag welding of high strength steels of the austenite-ferrite class (10Kh18N3G3D2L) or the ferrite-martensite class (0Kh12NDL) with low-alloy steels (for example, 20GSL) may result in a seam close in composition to the high-alloy steel, with possible deviation of the actual composition from that intended. This causes unwanted variations in the mechanical properties of the seam metal. When these steels are electroslag welded with rod which has a high chromium and nickel content, the seam metal has high ductility and σ_k with low strength ($\sigma = 22-24$ kg/mm²). The optimum combination of ductility and strength ($\sigma > 30$ kg/mm², $\sigma_b > 50$ kg/mm², $\rho > 10\%$, $\alpha_k > 5$ kg/cm²) in welded joints between high-alloy steel (10Kh18N7G3D2L)

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L 55950-65

ACCESSION NR: AR5008969

or OKh12NDL) and low-alloy steel (20GSL) can be obtained by electroslag welding with Ch04NZM rod (C=0.06%, Ni=3.0-3.5%, Mo=0.6-0.9%), with additional introduction into the seams of Armco iron in a thickness of 8-12 mm in the form of a consumable welding tip or as facing on the welded edges. The melting depth of each edge being welded should not exceed 15 mm.

SUB CODE: MM, 1E

ENCL: 00

Card 2/2

GEL'MAN, A.S.; MEL'BARD, S.N.

Some characteristics of the flash butt welding process. Atom.
(MIFA 18:1)
Svar. 17 no.6:39-43 Ja '64

1. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii
i mashinostroyeniya.

L 1895-66 EWT(d)/EPA(B)-2/EWT(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWP(b)/EWP(l)
 UR/0286/65/000/013/0046/0046
 621.791.762.5
 64
 13

ACCESSION NR: AP5021573EWA(c) JI/HM

AUTHOR: Mel'bard, S. N.; Gel'man, A. Sh.; Slepak, E. Sh.; Ovchinnikov, A. S.
 44.55; 44.55; 44.55

TITLE: Method of automatic control of flash butt welding. Class 21, No. 172413
 44.55 18

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 13, 1965, 46

TOPIC TAGS: welding, flash welding, continuous flash butt welding, fusion current, automatic control

ABSTRACT: An Author Certificate has been issued for a method of automatic control of continuous flash welding. The control, based on welding-current changes with time, operates on the magnitude and sign of the imbalance between the given and actual values of the fusion current using a controlled choke coil. [MS]

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya (Central Scientific Research Institute of Technology and Machine Building)
 44.55

SUBMITTED: 26Dec63
 NO REF SOV: 000
 Card 1/1 *mlh*

ENCL: 00
 OTHER: 000

SUB CODE: IE
 ATD PRESS: 4090

GEL'MAN, A.S., prof., doktor tekhn. nauk; SLEPAK, E.S., kand. tekhn. nauk;
MEL'BARD, S.N., kand. tekhn. nauk; VIVSI, S.N., inzh.

Present state and prospects for the development of butt joint
welding of pipe heating surfaces. Teploenergetika 12 no.11:
63-66 N '65. (MIRA 18:10)

1. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii
i mashinostroyeniya i ZIO.

GEL'MAN, A.S.

The nature of friction welding. Avtom. svar. 18 no.3:5-10
(MIRA 18:6)
Mr '65.

1. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii
i mashinostroyeniya.

L 21748-66 EWT(m)/EWP(v)/T/EWP(t)/EWP(k) JD/HM

ACC NR: AP6005890

SOURCE CODE: UR/0096/65/000/011/0063/0066

AUTHOR: Gel'man, A. S. (Professor, Doctor of technical sciences); 4/2
Slopak, B. S. (Candidate of technical sciences); Mel'bard, S. N.
(Candidate of technical sciences); Vivosi, S. N. (Engineer)

ORG: TSIITMASH, Z10

TITLE: Present state and future prospects for the development of butt welding of the tubes of a heating surface

SOURCE: Teploenergetika, no. 11, 1965, 63-66

TOPIC TAGS: welding technology, heating engineering, flash welding, high frequency

ABSTRACT: At the present time, the main industrial process used for joining the tubes of heating surfaces is flash butt welding. This welding method, which produces joints of sufficiently high quality, is accompanied by the formation of a large bur which is difficult to get rid of. The present article is a review of recent work in the Soviet Union aimed at improving the quality of heating surfaces by better control of the heating process during flash and contact welding and by the development of techniques for tube butt welding using high

Card 1/2

UDC: 621.643.411.4

L 21748-66

ACC NR: AP6005890

frequency currents. Results obtained in various of the experiments are illustrated graphically and with oscillograms. Orig. art. has: 7 figures and 2 tables.

SUB CODE: 13/ SUBM DATE: none

Card 2/2

JVR

ACC NR: AP6034621

SOURCE CODE: UR/0380/66/000/006/0066/0072

AUTHOR: Gel'man, A. S. (Moscow); Prokof'yev, V. N. (Moscow); Furman, F. A. (Moscow)

ORG: none

TITLE: Wave processes in hydraulic couplings of hydraulic transmissions

SOURCE: Mashinovedeniye, no. 6, 1966, 66-72

TOPIC TAGS: vibration propagation, sound propagation, vibration transmission, fluid flow, flow analysis, *HYDRAULIC ENGINEERING*

ABSTRACT: The propagation of a sound wave in a hydraulic pressure line consisting of a system of two pipes and two vessels filled with an elastic fluid is investigated, and the influence of the vessels on the propagation mechanism of the sound wave is determined. From a fluid's differential equations of motion and continuity, considering its initial and sectional boundary conditions, and applying Fourier and graphic computation methods, an equation is derived which permits the pressure and the flow velocity at any point in the system to be determined. As demonstrated by a numerical example, a sudden inflow-pressure change effects in the next vessel a harmonic pressure change of an amplitude equal to the pressure jump and of a lag equal to the pressure wave's propagation time to the vessel. The pressure fluctuation frequency is influenced by the presence of the second vessel, and the natural fluctua-

Card 1/2

UDC: 532.542

ACC NR: AP6034621

tion period of the first vessel, considering it as a resonator, decreases by the effect of the second vessel proportionally to a given factor. Orig. art. has: 4 figures and 12 formulas. [WA-98]

SUB CODE: 13, 20/ SUBM DATE: 19May65/ ORIG REF: 004/ OTH REF: 002/

Card 2/2

GEL'MAN, A

S

Ed.

Promyshlennyy Transport. Pod red. A.S. Gel'mana
i A.V. Federov. Moskva, Gosstroyizdat, 1960.

431 p. illus., diags., graphs, maps, tables
(Spravochnik Proyektirovshchika Promyshlennykh,
Zhilykh i Grazhdanskikh Zdaniy i Soorusheniy)

At head of title: Glavstroyproyekt pri Gosstroye
SSSR, and Gosudarstvennyy Proyektnyy Institut po.
Proyektirovaniyu Promshlennogo Transporta (Promtrans-
proyekt)

19

APPARATUS FOR ANNEALING HIGH-VOLTAGE INSULATORS. A. T. GELMAN and E. G. SMOYEV. Russ. 10,518, Feb. 28, 1931.

ASD-516 METALLURGICAL LITERATURE CLASSIFICATION

A 500

Notes, Summary, etc.
on the firing zone

Tunnel kiln for firing chinaware. A. T. GILMAN AND
R. C. BROWN. Russ. 62, 1978, May 31, 1981, 701-5
Between the firing zone and the preheating zone are in-
stalled by-passes and atomizers. Their function is to
regulate the gaseous medium independently of the burners
in the firing zone. M. Ho

GEL'MAN, A.T.

"The ceramic industry in the USSR and the outlook for its development,"
Authors: A.S. Berkman, G.L. Bruk, A.T. Gel'man (et al.), in symposium:
Syr'yevyve resury tonkokeram. prom-eti SSSR i puti ikh ispol'zovaniya,
Moscow-Leningrad, 1948, p. 7-32

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

1ST AND 2ND COPIES										PROCESSING AND PROPERTIES INDEX									
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<p>High-Temperature Laboratory Furnace. (In Russian.) D. B. Ginzburg and A. T. Zolotarev. <i>Ogneupory</i> (Refractories), v. 14, Oct. 1949, p. 465-466.</p> <p>Describes above, incorporating air preheating and using low-pressure oil burners. Temperatures up to 1760°C. may be obtained. Design details are illustrated schematically. Specific characteristics are indicated.</p>																			
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7

Laboratory flame furnaces for firing ceramic tiles and
for glassmaking. D. B. Ginsburg and A. T. Gel'man.
Steklo i Keram. 7, No. 8, 16-18(1960); cf. *C.A.* 43, 3013g.—
Illustrated descriptions of furnaces with rotary bottom, for
temps. up to 1550°, light lining and simple metal recu-
perator, for temps. up to 1550°, and needle-like recu-
perator, for temps. up to 1750°. B. Z. Kamich

Vibrating ball mill. A. T. Gel'man, A. I. Rut, and S. A.
Erzon. U.S.S.R. 107,100, Aug. 28, 1957. Structural de-
tail. M. H.

86/m

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4

1. NOVIKOV, V. A., KICHIN, N. K., ENG., YATSOV, V. S., KARKLIN, A. S., 1952, A. Ta.
2. USSR (600)
4. Motor Trucks
7. UKAP - TsINS universal truck with conveyor-loader. Makh. trud. rab. 6, no. 10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953, Uncl.

1. GEL'MAN, A.Y., NOVIKOV, V.V. KICHIGIN, N.M., YEMSTOV, V.G., KAZDOVIN, A.S.
2. USSR (600)
4. RESERVOIRS
7. Cleaning water supply reservoirs at sugar factories. Sakh.prom. 26, no. 12, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

GEL'MAN, A.Ya.

Automation of sugar factory boiler rooms fired with liquid fuel.
Sakh.prom. 36 no.5:35-40 My '62. (MIRA 15:5)

1. Kiyevenergonaladka.
(Boilers) (Automatic control)

GEL'MAN, A. YE.

GEL'MAN, A. YE. "The Reduceability of One Class of Systems of Differential Equations with Quasi-Periodic Coefficients." Leningrad Order of Lenin State U imeni A.A. Zhdanov. Leningrad, 1956. (Dissertation for the Degree of Candidate in Physicomathematical Science)

So: Knizhnaya Letopis', No. 18, 1956.

GEL'MAN, A.Ye.

20-4-3/51

AUTHOR: GEL'MAN, A.Ye.

TITLE: On the Reducibility of a Class of Systems of Differential Equations With Quasiperiodic Coefficients (O privodimosti odnogo klasse sistem differentsial'nykh uravneniy s kvaziperiodicheskimi koeffitsiyentami)

PERIODICAL: Doklady Akad.Nauk SSSR, 1957, Vol.116, Nr.4, pp.535-537 (USSR)

ABSTRACT: Let $f(t)$ be quasiperiodic. Let $\bar{f}(\lambda) = \sum_{j=0}^{\infty} a_j \lambda^j$, $a_j > 0$;

$\lim_{j \rightarrow \infty} a_j = 0$. $\bar{f}(\lambda)$ is called a corresponding majorant of $f(t)$, denoted with $f(t) \preceq \bar{f}(\lambda)$, if $f(t) = \sum_{j=0}^{\infty} P_j(t)$ converges uniformly, where

$$P_j(t) = \sum_{|m_1| + \dots + |m_n| \leq j} \eta_{m_1 m_2 \dots m_n} \cdot e^{it(m_1 \omega_1 + \dots + m_n \omega_n)}, \quad |P_j(t)| \leq a_j.$$

From $f_1(t) \preceq \bar{f}_1(\lambda)$, $f_2(t) \preceq \bar{f}_2(\lambda)$ there follows: 1) $f_1 + f_2 \preceq \bar{f}_1 + \bar{f}_2$, 2) $f_1 \cdot f_2 \preceq \bar{f}_1 \cdot \bar{f}_2$, 3) $F(t) = e^{\Delta t} \int_t^{\infty} f_1(x) e^{-\Delta x} dx \preceq \frac{\bar{f}_1(\lambda)}{\Delta}$ ($\Delta > 0$),

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On the Reducibility of a Class of Systems of Differential
Equations With Quasiperiodic Coefficients

20-4-3/51

4) $|x_1| \leq |\bar{f}_1(1)|$ if the series converges for \bar{f}_1 as $\lambda \rightarrow 1$.

Theorem 1: Given the equation of Riccati $\dot{C} = \xi(t) + f(t)C + r(t)C^2$,
where ξ, f, r are quasiperiodic. If there exist $\bar{\xi}(\lambda), \bar{f}(\lambda), \bar{r}(\lambda)$
(where the radii of convergence are corresponding series > 1)

such that $\xi(t) \leq \bar{\xi}(\lambda), f \leq \bar{f}, r \leq \bar{r}, \bar{f}(1) + 2\sqrt{\bar{\xi}(1)\bar{r}(1)} < 2\bar{f}(0)$,
then there exists a quasiperiodic solution $C(t)$ and the corresponding
 $\bar{C}(\lambda)$ with the radius of convergence > 1 and $C(t) \leq \bar{C}(\lambda)$.

Theorem 2: Given the system $\dot{x} = P_{11}(t)x + P_{12}(t)y, \dot{y} = P_{21}(t)x + P_{22}(t)y$,
where the radii of convergence of $P(\lambda)$ are greater than 1. Let
the equation $\dot{C} = P_{12} + (P_{22} - P_{11})C - P_{21}C^2$ satisfy the conditions of
theorem 1. Let the numbers $\omega_1, \omega_2, \dots, \omega_n$ be algebraic (eventually
with the exception of a common factor). Then the given system is
reducible (cf. Erugin [Ref. 1]).

ASSOCIATION: Leningrad Electrotechnical Institute im. V.I. Ul'yanov (Lenin)
(Leningradskiy elektrotekhnicheskiy institut im. V.I. Ul'yanova (Lenina))

PRESENTED BY: V.I. Smirnov, Academician, January 4, 1957

SUBMITTED: December 28, 1956

AVAILABLE: Library of Congress

Card 2/2

66817

SOV/155-58-5-6/37

16(4) 16 2600

AUTHOR:

Gel'man, A.Ye.

TITLE:

Some Estimations for the Function of the Type

$$x(t) = \frac{2}{\pi} \int_0^{\Omega} \frac{\sin \omega t}{\omega} R(\omega) d\omega$$

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 5, pp 29-30 (USSR)

ABSTRACT:

Let $R(\omega)$ be summable on $(0, \Omega)$ and almost everywhere positive.

$$I_0 = \int_0^{\Omega} R(\omega) d\omega, I_2 = \int_0^{\Omega} \omega^2 R(\omega) d\omega, x(t) = \frac{2}{\pi} \int_0^{\Omega} \frac{\sin \omega t}{\omega} R(\omega) d\omega$$

$$X = \sup_{0 < t < \infty} x(t).$$

Then it is

$$X > \frac{2}{\pi} I_0 \sqrt{\frac{I_1}{I_2}}$$

Theorem: Let $R(\omega)$ satisfy the conditions of the preceding

AGE

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Card 2

Card 1/2

Imeni

AUTHOR: Gel'man, A.M.

20-118-6-3/43

TITLE: A Sign of the Existence of Certain Classes of Solutions of a Nonlinear Differential Equation and Some Estimations in the Method of the Small Parameter (Odn priznak sushchestvovaniya opredelennykh klassov resheniy nelineynogo differentsial'nogo uravneniya i nekoteryye otsenki v metode malogo parametra)

PERIODICAL: Doklady Akademii Nauk, 1958, Vol 118, Nr 6, pp 1063-1065 (USSR)

ABSTRACT: The author considers the very general system

$$L(y) = \psi(t) + F(t, y, y', \dots, y^{(n)}),$$

where $L(y)$ is a linear differential expression, $\psi(t)$ is bounded and measurable and F is analytic in the neighborhood of the zero point, $F(t, 0, 0, \dots, 0) = 0$. By majorising of F the author obtains assertions on the existence of bounded solutions being periodic, quasiperiodic or almost-periodic, respectively. The absolute value of the solutions is estimated by the real parts of the zeros of the characteristic equation of $L(y)$ and by the smallest positive root of the equation $\phi'(x) + \frac{\psi}{x} = 1$, where

Card 1/2 $\phi(x)$ is the majorant of F . The same investigations are valid

A Sign of the Existence of Certain Classes of Solutions of 20-110-6-3/43
a Nonlinear Differential Equation and Some Estimations in the
Method of the Small Parameter

for the case that ψ and F depend moreover on a small
parameter λ .

There are 5 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut imeni V.I. Uflyanova
(Lenina) (Leningrad Electrotechnical Institute imeni V.I.
Uflyanov (Lenin))

PRESENTED: September 12, 1957, by V.I. Smirnov, Academician

SUBMITTED: May 22, 1957

Card 2/2

16(1)

AUTHOR: Gel'man, A.Ye.

SOV/20-123-5-3/50

TITLE: The Method of the Small Parameter for Operator Equations
(Metod malogo parametra dlya operatornykh uravneniy)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 5, pp 782-784 (USSR)

ABSTRACT: Let Y be a space of the type B and let Y_λ be the linear system of all formal power series $y(\lambda) = \sum_{k=0}^{\infty} y_k \lambda^k$, $y_k \in Y$. Let $y(\lambda) \leq \sum_{k=0}^{\infty} x_k \lambda^k$ mean that $\|y_k\| \leq x_k$. If $\sum_{k=0}^{\infty} x_k \lambda^k$ is convergent, then let it be equal to $x(\lambda)$. Then let $y(\lambda) \leq x(\lambda)$.
Theorem: Let the operator Ω_λ satisfy the following conditions:
1) Ω_λ maps Y_λ onto itself, where $\Omega_\lambda[y(\lambda)] = \Omega_0(0) + \sum_{k=1}^{\infty} \lambda^k \omega_k(y_0, y_1, \dots, y_{k-1})$, where ω_k maps the set of k -dimensional vectors with components of Y onto Y . 2) There exists a double series $\bar{\Omega}(\lambda, x) = a + \lambda \sum_{i,j=0}^{\infty} a_{ij} x^i \lambda^j$ with positive radii of convergence so that for

Card 1/2

The Method of the Small Parameter for Operator Equations SOV/20-123-5-3 (3)

$y(\lambda) \in x(\lambda)$, $x(0) \in R$ (R radius of convergence of the series $\bar{\Omega}(\lambda, x)$ with respect to x) there holds: $\Omega_\lambda[y(\lambda)] \approx \bar{\Omega}_\lambda[\lambda, x(\lambda)]$.

3) $\|\Omega_0(0)\| < R$. Then it holds: a) the equation $y = \Omega_\lambda(y)$ has a unique solution in Y_λ ; b) this solution converges for $|\lambda| < \Lambda$, $\Lambda = \sup_{0 < x < k} \lambda$, where $x = \bar{\Omega}(\lambda, x)$; c) $y(\lambda) \in x(\lambda)$, where $x(\lambda)$ is the unique solution of the equation $x = \bar{\Omega}(\lambda, x)$, analytic with respect to λ .

A second theorem is concluded from the first one and it has a similar contents.

There are 6 references, 4 of which are Soviet, 1 French, and 1 American.

ASSOCIATION: Leningradskiy elektrotekhnicheskii institut imeni V.I.Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni V.I. Ul'yanov (Lenin))

PRESENTED: July 11, 1958, by V.I.Smirnov, Academician

SUBMITTED: June 25, 1958

Card 2/2

S/044/61/000/008/013/039
C111/C333

AUTHOR: Gel'man, A. Ye.

TITLE: On the question concerning the periodic solution of the differential equation of the synchronous motor

PERIODICAL: Referativnyy zhurnal, Matematika, no. 8, 1961, 28, abstract 8B125. ("Izv. Leningr. elektrotekhn. in-ta", 1959 39, 285-291)

TEXT: The author gives new conditions for the existence of a periodic solution in x of the equation

$$\ddot{x} + f_1(x) \dot{x} = f_2(x),$$

where $f_1(x)$, $f_2(x)$ are periodic functions. A method is given, with the aid of which this solution can be determined as a uniformly convergent series of periodic functions. The remainder term of the series obtained is estimated. It is noted that, if $f_1(x)$, $f_2(x)$ are trigonometric polynomials, the series mentioned consists of trigonometric polynomials too; this case proves, according to the opinion of the author, the

Card 1/2

On the question concerning the . . . S/044/61/000/008/013/039
C111/C333
advantage of the new method compared with the method of V. A. Tabuyeva.
[Abstracter's note: complete translation.]

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Card 2/2

GELMAN, A.Ye.

16(1)
Vsesoyuznyy matematicheskiy s"ezd. 3rd, Moscow, 1956

Trudy. t. 4: Kratkoye sozhraniye sektsionnykh dokladov. Doklady inostrannykh uchennykh (Transcriptions of the 3rd All-Union Mathematical Conference in Moscow. vol. 4. Summary of Sectional Reports. Reports of Foreign Scientists) Moscow, Izd-vo M SSSR, 1959. 247 p. 2,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Matematicheskiy Institut. Tech. Ed.: G.M. Brevchansk; Editorial Board: A.A. Abramov, V.G. Boltyanskii, A.M. Gail'yev, B.V. Medvedev, A.D. Rynskii, S.M. Shtiml'skiy (sec. Mat.); A.G. Pustnikov, Yu. V. Prokhorov, E.A. Rybnikov, P. L. Ul'man, V.A. Zaslavskiy, N.G. Chetaev, O. Ye. Shilov, and A.I. Shirshov.

PERIOD: This book is intended for mathematicians and physicists.

COVERAGE: The book is Volume IV of the Transactions of the Third All-Union Mathematical Conference, held in June and July 1956. The book is divided into two main parts. The first part contains summaries of the papers presented by Soviet scientists at the Conference that were not included in the first two volumes. The second part contains the text of reports submitted to the editor by non-Soviet scientists. In those cases when the non-Soviet scientist did not submit a copy of his paper to the editor, the title of the paper is cited and, if the paper was printed in a previous volume, reference is made to the appropriate volume. The papers, both Soviet and non-Soviet, cover several topics in number theory, algebra, differential and integral equations, function theory, functional analysis, probability theory, topology, mathematical problems of mechanics and physics, computational mathematics, mathematical logic and the foundations of mathematics, and the history of mathematics.

Volume IV (Leningrad). Certain generalizations of the concept of group and problems of stability for partial differential equations

16
Gel'man, A.Ye. (Leningrad). On the behavior of solutions of linear elliptic systems in the neighborhoods of certain singular manifolds

16
Gel'man, A.Ye. (Leningrad). On the reducibility of systems of differential equations with quasiperiodic coefficients

17
Gel'man, A.Ye. (Leningrad). Description of nonresonant singular points of dynamic systems on the plane by means of the points of preimage systems

18
Gel'man, A.Ye. (Moscow). On the solvable extensions of linear differential operators of the first order

18
Gel'man, A.Ye. (Leningrad). On one method of determining the asymptotic properties of the eigenvalues and eigenfunctions of elliptic systems.

17

2

16(1)

AUTHOR: Gel'man, A.Ye.

SOV/20-127-5-2/58

TITLE: Theorems on Implicit Abstract Functions and Problems of Stability for Operator Equations

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 945-948 (USSR)

ABSTRACT: Let ϕ , ψ , Z be metric spaces, the operator $\Omega(\varphi, y)$ is assumed to map $\phi \times \psi$ into Z .

$$\bar{\Omega}'_y(\varphi_0, y_0) =$$

$$= \lim_{\lambda \rightarrow 0} \sup_{\substack{\varphi_\lambda(\varphi_0, \varphi) < \lambda, \psi_\lambda(y_2, y_0) < x \\ x \rightarrow 0, \psi_\lambda(y_1, y_0) < x, y_1 \neq y_2}} \frac{\varphi_Z[\bar{\Omega}(\cdot, y_2) - \bar{\Omega}_1(\varphi, y_1)]}{\psi(y_2, y_1)}$$

is denoted as Lipschitz derivative of $\Omega(\varphi, y)$ with respect to y in the point (φ_0, y_0) .

Theorem 1: Let 1.) ϕ , ψ be metric spaces, 2.) let $\Omega(\varphi, y)$

Card 1/3

Theorems on Implicit Abstract Functions and Problems
of Stability for Operator Equations

SOV/20-127-5-2/58

map $\phi \times \psi$ into \mathcal{B} , 3.) let $(\psi_0, y_0) \in \mathcal{B} \times \mathcal{C}$ exist so that
 $y_0 = \Omega(\psi_0, y_0)$ 4.) let $\Omega(\psi, y_0)$ be continuous in ψ_0 ,
 5.) let $\bar{\Omega}(\psi_0, y_0)$ exist and be < 1 , 6.) let a complete
 metric space Y exist which is formed of elements of \mathcal{C} with
 the metric of \mathcal{C} so that a.) $\Omega(\mathcal{C}, Y) \subset Y$ b.) $y_0 \in Y$.
 Then there exist numbers $\bar{\lambda} > 0$, $\bar{x} > 0$ and a uniquely de-
 termined operator $y(\psi)$ which maps the $\bar{\lambda}$ -neighborhood of ψ_0
 into the \bar{x} -neighborhood of the point y_0 and satisfies
 there the equation $y = \Omega(\psi, y)$. This operator is continuous
 in ψ_0 and maps the mentioned $\bar{\lambda}$ -neighborhood into Y .

With the aid of this theorem the author investigates in theorem
 2 the solution $u(\varphi)$ of the system of operator equations

$$(1) \quad L(u) = \omega(u), \quad \Lambda(u) = \varphi.$$

Qualitative as well as quantitative statements are obtained.

Card 2/3

Theorems on Implicit Abstract Functions and Problems
of Stability for Operator Equations

SOV/20-127-5-2/58

Several well-known results of the theory of non-linear differential equations are obtained as special cases, e.g. the theorems of Lyapunov [Ref 2_] on the stability in the noncritical case.

Altogether there are 4 theorems and 3 lemmata.

There are 5 references, 2 of which are Soviet, 2 German, and 1 Swedish.

ASSOCIATION: Leningradskiy elektro-tekhnicheskij institut imeni V.I.
Ul'yanova (Lenina) (Leningrad Electrotechnical Institute imeni
V.I. Ul'yanov (Lenin))

PRESENTED: April 27, 1959, by V.I. Smirnov, Academician

SUBMITTED: April 17, 1959

Card 3/3

GEL'MAN, A.Ye., kand.fiziko-matematicheskikh nauk

Problem concerning the periodic solution of the differential
equation of a synchronous motor. Izv. LETI 57 no.39:285-291
'59. (MIRA 15:10)

(Differential equations)
(Electric motors, Synchronous)

GEL'MAN, A.Ye.

Asymptotic formulas for coefficients of one class of power
series. Vest. LGU 15 no.19:19-28 '60. (MIRA 13:9)
(Series)

84905

S/043/60/019/004/009/015XX
C 111/ G 333

16.4100

AUTHOR: Gel'man, A. Ye.

TITLE: Some Asymptotic Formulas for the Coefficients of a Class of Degree Series

PERIODICAL: Vestnik Leningradskogo universiteta, Seriya matematiki, mekhaniki i astronomii, 1960, Vol.19, No.4, pp.19-28

TEXT: The functions

$$f_1(\lambda) = \sum_{k=0}^{\infty} a_k \lambda^k \quad \text{and} \quad f_2(\lambda) = \sum_{k=0}^{\infty} b_k \lambda^k$$

are called equal in the limit (in symbols: $f_1(\lambda) \Rightarrow f_2(\lambda)$), if

$$\lim \frac{a_k}{b_k} = 1.$$

Definition: $f(\lambda) = \sum_{k=0}^{\infty} a_k \lambda^k$ is called correct, if

1.) $a_k > 0$ ($k \geq 0$); 2.) $\sum_{k=0}^{\infty} a_k$ converges; 3.) $\lim \frac{a_{k-1}}{a_k} = 1$;

4.) it exists a c so that for all $n' > \frac{n}{2}$ it holds $\frac{a_{n'}}{a_n} < c$.

Card 1/4

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S/043/60/019/004/009/015XX
C 111/ C 333

Some Asymptotic Formulas for the Coefficients of a Class of Degree Series

Lemma 1: If $\lim_{n \rightarrow \infty} \frac{a_{n-1}}{a_n} = 1$, then there exists an increasing function $m(n)$ so that

$$1. \lim_{n \rightarrow \infty} m(n) = \infty; \quad 2. \lim_{n \rightarrow \infty} \max_{0 \leq m \leq m(n)} \left| \frac{a_{n-m}}{a_n} - 1 \right| = 0.$$

Lemma 2: If $\frac{a_i}{a_n} \leq c$ for $i \geq \left[\frac{n}{2} \right]$ and all n , then it is

$$\frac{a_i}{a_n} \leq c p^{\lg_2 c} \text{ for } i \geq \left[\frac{n}{p} \right], \quad p \geq 2 \text{ for all } n.$$

Theorem: If $\varphi_1(\lambda)$ and $\varphi_2(\lambda)$ are correct functions, then it is

$$\varphi_1(\lambda) \cdot \varphi_2(\lambda) \implies \varphi_1(1) \cdot \varphi_2(\lambda) + \varphi_2(1) \cdot \varphi_1(\lambda).$$

Corollary: The product of two correct functions is a correct function.

Consequence by induction from n to $n+1$:

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Some Asymptotic Formulas for the Coefficients of a Class of Degree Series

$$\prod_{k=1}^n \frac{\varphi_k(\lambda)}{\varphi_k(1)} \Rightarrow \sum_{k=1}^n \frac{\varphi_k(\lambda)}{\varphi_k(1)}$$

Theorem 2: Let $P_n(x)$ be a polynomial of n -th degree, $\varphi(\lambda)$ correct function $P_n[\varphi(1)] \neq 0$. Then it is

$$P_n[\varphi(\lambda)] \Rightarrow P_n'[\varphi(1)] \varphi(\lambda).$$

Theorem 3: Let $f(x) = \sum_{k=0}^{\infty} b_k x^k$; $\varphi(\lambda)$ correct function; the

point $x = \varphi(1)$ is assumed to lie in the region of convergence of the series $f(x)$; let $f'[\varphi(1)] \neq 0$. Then it is

$$f[\varphi(\lambda)] \Rightarrow f'[\varphi(1)] \varphi(\lambda).$$

Examples:

$$\varphi(\lambda) = \sum_{k=1}^{\infty} \frac{\lambda^k}{k^2}, \quad f(x) = \sin x. \quad \text{Then it is}$$

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$$\sin \left(\sum_{k=1}^{\infty} \frac{\lambda^k}{k^2} \right) \Rightarrow \cos \frac{\pi^2}{6} \cdot \sum_{k=1}^{\infty} \frac{\lambda^k}{k^2} \quad \cdot$$

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S/020/60/132/03/03/066

AUTHOR: Gel'man, A.Ye.

TITLE: Theorems on an Implicit Abstract Analytic Function

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 3, pp.501-503

TEXT: Let Y, Φ and Z be complex Banach spaces. The function $\Omega(y, \varphi)$ with values in Z defined in the region D of the space $Y \times \Phi$ is called analytic in D in the variables y, φ if it is unique and continuous as a function of the point (y, φ) and if in D it is G -differentiable with respect to y and φ (terminology of Hill (Ref. 1)). Without proofs the author formulates three long theorems on implicit analytic functions. From the qualitative part of these theorems there follow the classical theorems a) of Weierstraß on implicit analytic functions, b) of Poincaré on the series development of the solution of a differential equation with respect to a parameter, c) of Lyapunov on holomorphic solutions of systems of differential equations, etc. The part as to quantity of the theorems permits an estimation of the region of convergence

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and the remainder terms of the mentioned nonlinear problems.
There are 2 non-Soviet references.

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SUBMITTED: December 23, 1959

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16.3400

AUTHOR: Gel'man, A.Ye.

TITLE: On periodic, quasiperiodic and bounded solutions of a class of linear differential equations

PERIODICAL: Referativnyy zhurnal, Matematika, no.1, 1961, 34, abstract 1B 143 ("Izv.Leningr.elektrotekhn. in-ta", 1958, vyp.35, 231-238)

TEXT: The author considers the linear differential equation

$$y'' + [A + \varphi_1(t)]y' + [B + \varphi_2(t)]y = f(t), \quad (1)$$

where A and B are constants, $\varphi_1(t)$, $\varphi_2(t)$, $f(t)$ for $-\infty < t < +\infty$ are bounded functions integrable on every finite interval, where the roots k_1 and k_2 of the equation

$$k^2 + Ak + B = 0 \quad (2)$$

are so that $\alpha_s = \operatorname{Re} k_s \neq 0$ ($s=1,2$) and $d = |k_2 - k_1| \neq 0$. It is proved that if the inequality

$$\left(\left| \frac{k_1}{\alpha_1} \right| + \left| \frac{k_2}{\alpha_2} \right| \right) \sup |\varphi_1(t)| + \left(\left| \frac{1}{\alpha_1} \right| + \left| \frac{1}{\alpha_2} \right| \right) \sup |\varphi_2(t)| < d$$

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